

CHRISTINE O. GREGOIRE
Director



Colbert COLSF 8.2 VI

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Mail Stop PV-11 • Olympia, Washington 98504-8711 • (206) 459-6000

January 31, 1990

RECEIVED
FEB 01 1990
SUPERFUND BRANCH

Mr. Dean Fowler
Colbert Landfill Project Manager
Spokane County Public Works
North 811 Jefferson Street
Spokane, Washington 99260-0180

RE: Ecology Study of Little Spokane River and the Laboratory Results

Dear Dean:

The Department of Ecology recently completed a survey of water quality in the Little Spokane River, in the area of the Colbert Landfill. That work was conducted by Art Johnson of Ecology's Environmental Investigations and Laboratory Services Program, at my request. The objective of the study was to determine if solvent contaminated groundwater, due to the landfill, had reached the River. The second objective was to obtain some general water quality information on the Little Spokane River near the Colbert Landfill.

Enclosed please find Art Johnson's write-up of the September 12-13, 1989 survey. As you will note in the text, a follow-up survey was conducted on December 12, 1989 due to trace levels of Trichloroethane which were detected in the River. I will send you a copy of the December write-up once it becomes available.

If you have any questions regarding the results of this survey of the Little Spokane River, please give me a call at (206)438-3043 or SCAN 8-585-3043.

Sincerely,

Mike Blum

Mike Blum, Project Manager
Landfill Site Cleanup Section
Hazardous Waste Investigations
and Cleanup Program

MB:clr

Enclosure

cc: Larry Beard, Landau Associates
Neil Thompson, EPA
Susan McCarthy, EPA
Art Johnson, Ecology (w/o enclosures)

USEPA SF



1414318

WASHINGTON STATE DEPARTMENT OF ECOLOGY
ENVIRONMENTAL INVESTIGATIONS AND LABORATORY SERVICES PROGRAM
TOXICS INVESTIGATIONS/GROUND WATER MONITORING SECTION

TECHNICAL MEMORANDUM

January 25, 1990

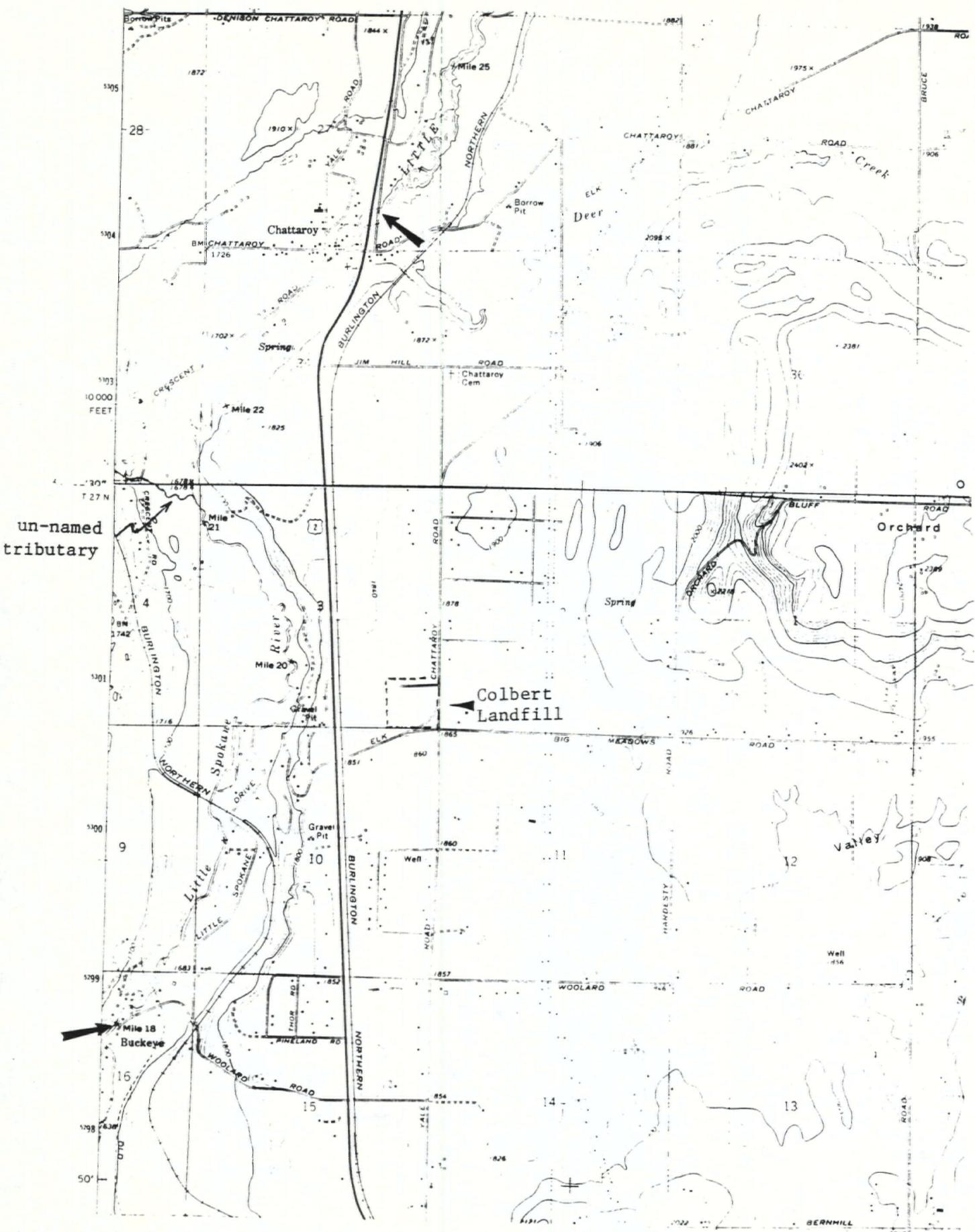
TO: Mike Blum
THROUGH: Bill Yake
FROM: Art Johnson
SUBJECT: Survey for Volatiles in the Little Spokane River

In response to your request, I conducted a brief survey of water quality in the Little Spokane River in the vicinity of the Colbert Landfill on September 12-13, 1989. The primary objective was to determine if the solvent-contaminated ground water plume beneath the landfill had reached the river. A secondary objective was to obtain general water quality data on this reach of the river.

Water samples were collected at Chattaroy just upstream of Highway 2 at the Eastern Washington University streamflow gaging station (river mile 23) and at the Woolard Road bridge (river mile 18). The Woolard bridge is approximately 1.5 miles downstream from Colbert Landfill (see figure).

Three grab samples were collected from center river at both sites over an 18-hour period. Sample containers for analysis of volatiles were standard 40 ml glass vials with teflon septa (I-Chem Series 300, Hayward CA) filled leaving no head space. A transfer blank was prepared in the field at the Woolard site; a transport blank was also carried through the survey. Samples were kept on ice and transported to the Ecology Manchester Laboratory on September 14. Volatiles were analyzed at Manchester by EPA Method 624 within 12 to 13 days of collection. Sampling and analysis methods for other water quality variables followed standard Ecology procedures described in Huntamer and Smith (1989).

River flow during the survey, based on gage heights at Chattaroy, ranged from 77.2 to 80.0 cfs (data provided by Greg Baca, Spokane Community College). Flow in the Little Spokane at the USGS Dartford gage (r.m. 11.4) was 109 cfs during the same period (data provided by Michael Boatsman, Ecology Eastern Regional Office). The 7-day, 10-year low flow for the Little Spokane at Dartford is 92 cfs; the 40-year average is 312 cfs (USGS, 1985).



SAMPLING STATIONS (→)

Results of analysis for volatiles showed a trace of 1,1,1-trichloroethane, the predominant ground water contaminant at Colbert, was present in all samples collected at Woolard bridge (Table 1). Concentrations were below the quantitation limit of the instrument and were estimated to be 2 ug/L. This concentration represents a load of approximately 0.8 lbs/day going into the river--assuming complete mixing and ignoring losses through volatilization. There was no evidence of trichloroethane in the Little Spokane upstream of the fill. In the opinion of the analyst, Greg Perez, a conservative estimate of the highest trichloroethane concentration that could have been present in the Chattaroy samples and escape detection is on the order of 0.5 ug/L.

The only other volatile compound detected during the survey was 2 ug/L of methylene chloride in the transport blank. The complete data set for the survey, including recoveries of matrix spikes and surrogates, is attached.

Table 2 summarizes the remaining water quality data. The river was within Class AA - A standards for temperature, dissolved oxygen, pH, and turbidity. Although a number of constituents showed elevated concentrations at Woolard relative to Chattaroy, changes of this magnitude occur in many rivers and cannot, based on these data, be attributed to the Colbert plume. Chloride concentrations at both sampling sites appeared to decrease over the course of the survey; other constituents remained relatively unchanged.

Nitrite/nitrate concentrations were much higher at Woolard than Chattaroy (average of 0.88 vs. 0.18 mg/L). Preliminary results from samples collected on December 12, 1989, (described below) suggest an un-named, right bank (facing downstream) tributary at approximately river mile 21.1 is a major nitrogen source to this reach of the river. This tributary is identified on the accompanying figure.

Two potentially toxic metals were analyzed: cadmium, in light of its detection in the Colbert plume, and mercury because Ecology ambient monitoring data show elevated concentrations at the mouth of the Little Spokane. Neither metal was present in detectable amounts during the present survey.

As you know, detection of trichloroethane in the Little Spokane was the impetus for the above-mentioned December 12 survey, designed to determine where the plume was entering the river. Samples for analysis of volatiles, specific conductance, chloride, and nitrite/nitrate were collected along a ten-station transect between Woolard bridge and Chattaroy. Samples were also collected from Sterling Spring (left bank, west of Colbert Landfill) and the river mile 21.1 tributary. More sensitive analytical methods are being employed on these samples in an effort to better quantify trichloroethane concentrations and detect other volatile compounds of concern. Chemical analyses should be completed by the end of January.

REFERENCES:

Huntamer, D. and C. Smith. 1989. Lab User's Manual. Wash. Dept. Ecology,
Manchester Laboratory.

USGS. 1985. Streamflow Statistics and Drainage Basin Characteristics of
the Southwestern and Western Regions, Washington. Volume II.
Open-file Report 84-145-B.

BY:AJ/sk

Attachments

cc: Carl Neuchterlein
Claude Sappington
Michael Boatsman
Dick Cunningham
Steve Twiss
Steve Hunter

Table 1. 1,1,1-Trichloroethane concentrations in the Little Spokane River above and below Colbert Landfill, September 1989.

<u>Location</u>	<u>Date</u>	<u>Time</u>	<u>Sample No. (37-)</u>	<u>1,1,1-Trichloroethane (ug/L)</u>
Chattaroy above Highway 2 Bridge	Sept 12	1430	8135	5 U
	Sept 12	1815	8133	5 U
	Sept 13	0755	8134	5 U
Woolard Road Bridge	Sept 12	1545	8130	2 J
			8130*	2 J
	Sept 12	1845	8131	2 J
	Sept 13	0830	8132	2 J
Transfer Blank	Sept 12	1615	8136	5 U
Transport Blank	--	--	8137	5 U
Method Blank	--	--	--	5 U

U = not detected; value shown is quantitation limit

J = estimated value

* = duplicate analysis

Table 2. Other water quality data for the Little Spokane River above and below Colbert Landfill, September 1989.

Location:	Chattaroy above Highway 2 Bridge			Woolard Road Bridge		
	Sept 12	Sept 12	Sept 13	Sept 12	Sept 12	Sept 13
Date:	Sept 12	Sept 12	Sept 13	Sept 12	Sept 12	Sept 13
Time:	1430	1815	0755	1545	1845	0830
Sample No. (37-):	8135	8133	8134	8130	8131	8132
Flow (cfs)	80.0	78.6	77.2	--	--	--
Temperature (°C)	14.6	15.3	12.0	14.4	14.5	10.6
pH (S.U.)	8.3	8.4	7.9	8.3/8.3*	8.2	8.0
Dissolved Oxygen (mg/L)	10.6	10.8	8.0	10.1	9.2	9.2
Spec. Conductivity (umhos/cm)	179	167	185	232/233*	223	233
Total Suspended Solids (mg/L)	1	1 U	2	1/1 U*	1	2
Turbidity (NTU)	1.2	1.6	0.9	1.0/0.9*	1.1	1.3
Total Hardness (mg/L)	98	97	100	129/129*	128	125
Chloride (mg/L)	3.21	1.63	1.56	3.61	2.56	1.94/1.93*
Nitrite/Nitrate (mg/L)	0.18	0.17	0.18	0.88/0.88*	0.87	0.90
Sulfate (mg/L)	4.88	4.76	4.85	6.61	6.60	6.59/6.60*
Silica (mg/L)	16.9/15.9*	16.0	16.5	19.3	19.2	19.0
Total Alkalinity (mg/L)	94	92	94	116/115*	115	115
Calcium (mg/L)	27.4	26.8	26.9	34.6/34.5*	34.2	34.0
Manganese (mg/L)	5.74	5.67	5.72	7.50/7.48*	7.32	7.27
Sodium (mg/L)	4.77	4.74	4.74	5.72/5.71*	5.58	5.58
Potassium (mg/L)	1.9	1.7	1.8	2.0/2.1*	2.1	2.1
Mercury (ug/L)	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
Cadmium (ug/L)	0.20 U	0.20 U	0.20 U	0.20U/0.20U*	0.20 U	0.20 U
Iron (ug/L)	54.9	66.4	67.2	55.6/58.0*	67.2	67.9
Manganese (ug/L)	9.1	9.1	11.1	13.7/13.7*	14.3	16.3

Note: Metals are total recoverable

* = duplicate analysis

U = not detected at detection limit shown

20-DEC-89
12:45:04

Washington State Department of Ecology
Sample/Project Analysis Results

Page 1

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES)

Officer: AFJ

Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378130

Description: WOOLARD

Source: Ambient Stream/River

Begin Date: 89/09/12 :

Gen Inorg/Phys-Speci		Water-Total	Result	Units	Metals - Total Recov	Water-Total	Result	Units	VOC - PP Scan (GCMS)	Water-Total	Result	Units
Cond@25C	Meter	232	*	umho/cm	Cadmium	Tot-Rec	0.20U	ug/l	Carbon Tetrachloride	5U	ug/l	
pH LAB	Meter	8.3	*	Std Units	Magnesium	Tot-Rec	7.48	mg/l	Acetone	10U	ug/l	
Alk-Tot	CaCO ₃	116	*	mg/l	Sodium	Tot-Rec	5.71	mg/l	Chloroform	5U	ug/l	
Alk-HCO ₃	CaCO ₃	116	*	mg/l	Potassium	Tot-Rec	2.1	mg/l	Benzene	5U	ug/l	
Alk-CO ₃	CaCO ₃	1U	mg/l	Iron	Tot-Rec	58.0	ug/l	1,1,1-Trichloroethane	2J*	ug/l		
Hard-Tot	CaCO ₃	129	*	mg/l	Manganese	Tot-Rec	13.7	ug/l	Bromomethane	10U	ug/l	
Silica	Total	19.3	*	mg/l					Chloromethane	10U	ug/l	
Turbidity	Meter	1.0	*	NTU					Dibromomethane	5U	ug/l	
Solids - Specified		Water-Total	Result	Units					Bromoform	5U	ug/l	
Solids		T-Suspen	1	mg/l					Bromodichloromethane	5U	ug/l	
Nutrients - Specific		Water-Total	Result	Units					1,1-Dichloroethane	5U	ug/l	
NO ₂ NO ₃ -N		Total	0.88	mg/l					1,1-Dichloroethene	5U	ug/l	
Metals - Total Recov		Water-Total	Result	Units					Trichlorofluoromethane	5U	ug/l	
Cadmium		Tot-Rec	0.20U	ug/l					Methane, Dichlorodiflu+	10U	ug/l	
Mercury		Tot-Rec	.06U	ug/l					1,2-Dichloropropane	5U	ug/l	
Metals - Total Recov		Water-Total	Result	Units					2-Butanone	10U	ug/l	
Matrix Spike #1									1,1,2-Trichloroethane	5U	ug/l	
Cadmium		Tot-Rec	112	% Recov					Trichloroethene	5U	ug/l	
Metals - Total Recov		Water-Total	Result	Units					ETHANE, 1,1,2,2-TETRAC+	5U	ug/l	
Matrix Spike #2									1,2,3-Trichlorobenzene	5U	ug/l	
Cadmium		Tot-Rec	109	% Recov					Hexachlorobutadiene	5U	ug/l	
Metals - Total Recov		Water-Total	Result	Units					Naphthalene	5U	ug/l	
Matrix Spike #2									Total Xylenes	5U	ug/l	
Cadmium		Tot-Rec	34.6	mg/l					2-Chlorotoluene	5U	ug/l	
Metals - Total Recov		Water-Total	Result	Units					1,2-Dichlorobenzene	5U	ug/l	
Matrix Spike #1									1,2,4-Trimethylbenzene	5U	ug/l	
Cadmium		Tot-Rec	7.50	mg/l					DBCP	5U	ug/l	
Metals - Total Recov		Water-Total	Result	Units					1,2,3-Trichloropropane	5U	ug/l	
Matrix Spike #2									Tert-Butylbenzene	5U	ug/l	
Cadmium		Tot-Rec	5.72	mg/l					Isopropylbenzene (Cumene)	5U	ug/l	
Metals - Total Recov		Water-Total	Result	Units					p-Isopropyltoluene	5U	ug/l	
Matrix Spike #1									BENZENE, ETHYL-	5U	ug/l	
Cadmium		Tot-Rec	2.0	mg/l					BENZENE, ETHENYL-	5U	ug/l	
Metals - Total Recov		Water-Total	Result	Units					BENZENE, PROPYL-	5U	ug/l	
Matrix Spike #2									Butylbenzene	5U	ug/l	
Cadmium		Tot-Rec	55.6	ug/l					4-Chlorotoluene	5U	ug/l	
Metals - Total Recov		Water-Total	Result	Units					1,4-Dichlorobenzene	5U	ug/l	
Matrix Spike #1									1,2-Dibromoethane (EDB)	10U	ug/l	
Cadmium		Tot-Rec	13.7	ug/l					1,2-Dichloroethane	5U	ug/l	
Metals - Total Recov		Water-Total	Result	Units					Vinyl Acetate	100	ug/l	

(Continued on next page)

20-DEC-89
12:45:04

Washington State Department of Ecology
Sample/Project Analysis Results

Page 2

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES)

Officer: AFJ

Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378130

Description: WOOLARD

Source: Ambient Stream/River

Begin Date: 89/09/12 :

VOA - PP Scan (GCMS) Water-Total			VOA - PP Scan (GCMS) Water-Total			VOA - PP Scan (GCMS) Water-Total			
*** Continued ***			*** Continued ***			*** Continued ***			
Result	Units	Duplicate #1	Result	Units	Duplicate #1	Result	Units	Result	Units
4-Methyl-2-Pentanone	10U ug/l	Trichlorofluoromethane	5U ug/l	Ethane, 1,1,1,2-Tetrac+	5U ug/l	Ethane, 1,1,1,2-Tetrac+	5U ug/l	Ethane, 1,1,1,2-Tetrac+	5U ug/l
1,3,5-Trimethylbenzene	5U ug/l	Methane, Dichlorodiflu+	10U ug/l	cis-1,3-Dichloropropene	5U ug/l	cis-1,3-Dichloropropene	5U ug/l	cis-1,3-Dichloropropene	5U ug/l
Bromobenzene	5U ug/l	1,2-Dichloropropane	5U ug/l	trans-1,3-Dichloroprop+	5U ug/l	trans-1,3-Dichloroprop+	5U ug/l	trans-1,3-Dichloroprop+	5U ug/l
Toluene	5U ug/l	2-Butanone	10U ug/l	Surrog: D4-1,2-Dichlor+	100 t Recov	Surrog: D4-1,2-Dichlor+	100 t Recov	Surrog: D4-1,2-Dichlor+	100 t Recov
Chlorobenzene	5U ug/l	1,1,2-Trichloroethane	5U ug/l	Surrog: 1,4-Bromofluor+	102 t Recov	Surrog: 1,4-Bromofluor+	102 t Recov	Surrog: 1,4-Bromofluor+	102 t Recov
1,2,4-Trichlorobenzene	5U ug/l	Trichloroethene	5U ug/l	Surrog: D8-Toluene	103 t Recov	Surrog: D8-Toluene	103 t Recov	Surrog: D8-Toluene	103 t Recov
Dibromochloromethane	5U ug/l	ETHANE, 1,1,2,2-TETRAC+	5U ug/l	+-----					
Tetrachloroethene	5U ug/l	1,2,3-Trichlorobenzene	5U ug/l	Ion Chromatography	Water-Total				
Sec-Butylbenzene	5U ug/l	Hexachlorobutadiene	5U ug/l	Water-Total					
1,3-Dichloropropane	5U ug/l	Naphthalene	5U ug/l	Result	Units				
Cis-1,2-Dichloroethene	5U ug/l	Total Xylenes	5U ug/l	Chloride	3.61 * mg/l				
trans-1,2-Dichloroethene	5U ug/l	2-Chlorotoluene	5U ug/l	Sulfate Total	6.61 * mg/l				
1,3-Dichlorobenzene	5U ug/l	1,2-Dichlorobenzene	5U ug/l						
1,1-Dichloropropene	5U ug/l	1,2,4-Trimethylbenzene	5U ug/l						
2,2-Dichloropropane	5U ug/l	DBCP	5U ug/l						
2-Hexanone	10U ug/l	1,2,3-Trichloropropane	5U ug/l						
Ethane, 1,1,1,2-Tetrac+	5U ug/l	Tert-Butylbenzene	5U ug/l						
cis-1,3-Dichloropropene	5U ug/l	Isopropylbenzene (Cumene)	5U ug/l						
trans-1,3-Dichloroprop+	5U ug/l	p-Isopropyltoluene	5U ug/l						
Surrog: D4-1,2-Dichlor+	93 % Recov	BENZENE, ETHYL-	5U ug/l						
Surrog: 1,4-Bromofluor+	100 % Recov	BENZENE, ETHENYL-	5U ug/l						
Surrog: D8-Toluene	101 % Recov	BENZENE, PROPYL-	5U ug/l						
+-----		Butylbenzene	5U ug/l						
VOA - PP Scan (GCMS) Water-Total		4-Chlorotoluene	5U ug/l						
Duplicate #1	Result	1,4-Dichlorobenzene	5U ug/l						
+-----		1,2-Dibromoethane (EDB)	10U ug/l						
Carbon Tetrachloride	5U ug/l	1,2-Dichloroethane	5U ug/l						
Acetone	10U ug/l	Vinyl Acetate	10U ug/l						
Chloroform	5U ug/l	4-Methyl-2-Pentanone	10U ug/l						
Benzene	5U ug/l	1,3,5-Trimethylbenzene	5U ug/l						
1,1,1-Trichloroethane	2J ug/l	Bromobenzene	5U ug/l						
Bromomethane	10U ug/l	Toluene	5U ug/l						
Chloromethane	10U ug/l	Chlorobenzene	5U ug/l						
Dibromomethane	5U ug/l	1,2,4-Trichlorobenzene	5U ug/l						
Bromochloromethane	5U ug/l	Dibromochloromethane	5U ug/l						
Chloroethane	10U ug/l	Tetrachloroethene	5U ug/l						
Vinyl Chloride	10U ug/l	Sec-Butylbenzene	5U ug/l						
Methylene Chloride	5U ug/l	1,3-Dichloropropane	5U ug/l						
Carbon Disulfide	5U ug/l	Cis-1,2-Dichloroethene	5U ug/l						
Bromoform	5U ug/l	trans-1,2-Dichloroethene	5U ug/l						
Bromodichloromethane	5U ug/l	1,3-Dichlorobenzene	5U ug/l						
1,1-Dichloroethane	5U ug/l	1,1-Dichloropropene	5U ug/l						
1,1-Dichloroethene	5U ug/l	2,2-Dichloropropane	5U ug/l						
		2-Hexanone	10U ug/l						

(Sample Complete)

20-DEC-89
12:45:04

Washington State Department of Ecology
Sample/Project Analysis Results

Page 3

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES)

Officer: AFJ

Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378131

Description: WOOLARD

Source: Ambient Stream/River

Begin Date: 89/09/12 :

Gen Inorg/Phys-Speci			Water-Total	Result	Units	VOA - PP Scan (GCMS)	Water-Total	Result	Units	VOA - PP Scan (GCMS)	Water-Total	Result	Units
Cond@25C Meter			223 *	umho/cm		Carbon Tetrachloride	5U	ug/l		4-Methyl-2-Pantanone	10U	ug/l	
pH LAB Meter			8.2 *	Std Unts		Acetone	10U	ug/l		1,3,5-Trimethylbenzene	5U	ug/l	
Alk-Tot CaCO3			115 *	mg/l		Chloroform	5U	ug/l		Bromobenzene	5U	ug/l	
Alk-HCO3 CaCO3			115 *	mg/l		Benzene	5U	ug/l		Toluene	5U	ug/l	
Alk-CO3 CaCO3			1U	mg/l		1,1,1-Trichloroethane	2J*	ug/l		Chlorobenzene	5U	ug/l	
Hard-Tot CaCO3			128 *	mg/l		Bromomethane	10U	ug/l		1,2,4-Trichlorobenzene	5U	ug/l	
Silica Total			19.2 *	mg/l		Chloromethane	10U	ug/l		Dibromochloromethane	5U	ug/l	
Turbidity Meter			1.1 *	NTU		Dibromomethane	5U	ug/l		Chloroethane	5U	ug/l	
Solids - Specified						Bromoform	10U	ug/l		Tetrachloroethene	5U	ug/l	
Solids T-Suspen			1 *	mg/l		Bromodichloromethane	5U	ug/l		Sec-Butylbenzene	5U	ug/l	
Nutrients - Specific						1,1-Dichloroethane	5U	ug/l		1,3-Dichloropropane	5U	ug/l	
NO2NO3-N Total			0.87 *	mg/l		1,1-Dichloroethene	5U	ug/l		Cis-1,2-Dichloroethene	5U	ug/l	
Metals - Total Recov						Trichlorofluoromethane	5U	ug/l		trans-1,2-Dichloroethene	5U	ug/l	
Cadmium Tot-Rec			0.20U	ug/l		Methane, Dichlorodiflu+	10U	ug/l		1,3-Dichlorobenzene	5U	ug/l	
Mercury Tot-Rec			.06U	ug/l		1,2-Dichloropropane	5U	ug/l		1,1-Dichloropropene	5U	ug/l	
Metals - Total Recov						2-Butanone	10U	ug/l		2,2-Dichloropropane	5U	ug/l	
Calcium Tot-Rec			34.2 *	mg/l		1,1,2-Trichloroethane	5U	ug/l		2-Hexanone	10U	ug/l	
Magnesium Tot-Rec			7.32 *	mg/l		Trichloroethene	5U	ug/l		Ethane, 1,1,1,2-Tetra-	5U	ug/l	
Sodium Tot-Rec			5.58 *	mg/l		ETHANE, 1,1,2,2-TETRAC+	5U	ug/l		cis-1,3-Dichloropropene	5U	ug/l	
Potassium Tot-Rec			2.1 *	mg/l		1,2,3-Trichlorobenzene	5U	ug/l		trans-1,3-Dichloroprop+	5U	ug/l	
Iron Tot-Rec			67.2 *	ug/l		Hexachlorobutadiene	5U	ug/l		Surrog: D4-1,2-Dichlor-	99	% Recov	
Manganese Tot-Rec			14.3 *	ug/l		Naphthalene	5U	ug/l		Surrog: 1,4-Bromofluor+	98	% Recov	
						Total Xylenes	5U	ug/l		Surrog: D8-Toluene	103	% Recov	
						2-Chlorotoluene	5U	ug/l					
						1,2-Dichlorobenzene	5U	ug/l					
						1,2,4-Trimethylbenzene	5U	ug/l					
						DBCP	5U	ug/l					
						1,2,3-Trichloropropane	5U	ug/l					
						Tert-Butylbenzene	5U	ug/l					
						Isopropylbenzene (Cum+	5U	ug/l					
						p-Isopropyltoluene	5U	ug/l					
						BENZENE, ETHYL-	5U	ug/l					
						BENZENE, ETHENYL-	5U	ug/l					
						BENZENE, PROPYL-	5U	ug/l					
						Butylbenzene	5U	ug/l					
						4-Chlorotoluene	5U	ug/l					
						1,4-Dichlorobenzene	5U	ug/l					
						1,2-Dibromoethane (EDB)	10U	ug/l					
						1,2-Dichloroethane	5U	ug/l					
						Vinyl Acetate	10U	ug/l					
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+													
Ion Chromatography													Water-Total
Water-Total													Result Units
Chloride													2.56 * mg/l
Sulfate													6.60 * mg/l

(Sample Complete)

20-DEC-89
12:45:04

Washington State Department of Ecology
Sample/Project Analysis Results

Page 4

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES)

Officer: AFJ

Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378132

Description: WOOLARD

Source: Ambient Stream/River

Begin Date: 89/09/13 :

Gen Inorg/Phys-Speci		Water-Total	Result	Units	VOA - PP Scan (GCMS)	Water-Total	Result	Units	VOA - PP Scan (GCMS)	Water-Total	Result	Units
Cond@25C		233 *	umho/cm		Carbon Tetrachloride	5U	ug/l		4-Methyl-2-Pentanone	10U	ug/l	
pH LAB		8.0 *	Std Units		Acetone	10U	ug/l		1,3,5-Trimethylbenzene	5U	ug/l	
Alk-Tot		115 *	mg/l		Chloroform	5U	ug/l		Bromobenzene	5U	ug/l	
Alk-HCO3		115 *	mg/l		Benzene	5U	ug/l		Toluene	5U	ug/l	
Alk-CO3		115 *	mg/l		1,1,1-Trichloroethane	2J*	ug/l		Chlorobenzene	5U	ug/l	
Hard-Tot		1U	mg/l		Bromomethane	10U	ug/l		1,2,4-Trichlorobenzene	5U	ug/l	
Silica Total		125 *	mg/l		Chloromethane	10U	ug/l		Dibromochloromethane	5U	ug/l	
Turbidity Meter		19.0 *	mg/l		Dibromomethane	5U	ug/l		Tetrachloroethene	5U	ug/l	
		1.3 *	NTU		Bromochloromethane	5U	ug/l		Sec-Butylbenzene	5U	ug/l	
					Chloroethane	10U	ug/l		1,3-Dichloropropane	5U	ug/l	
Solids - Specified		Water-Total	Result	Units	Methylene Chloride	10U	ug/l		Cis-1,2-Dichloroethene	5U	ug/l	
					Carbon Disulfide	5U	ug/l		trans-1,2-Dichloroethene	5U	ug/l	
Solids T-Suspen		2 *	mg/l		Bromoform	5U	ug/l		1,3-Dichlorobenzene	5U	ug/l	
					Bromodichloromethane	5U	ug/l		1,1-Dichloropropene	5U	ug/l	
Nutrients - Specific		Water-Total	Result	Units	1,1-Dichloroethane	5U	ug/l		2,2-Dichloropropene	5U	ug/l	
					Trichlorofluoromethane	5U	ug/l		2-Hexanone	10U	ug/l	
NO2NO3-N Total		0.90 *	mg/l		Methane, Dichlorodiflu+	10U	ug/l		Ethane, 1,1,1,2-Tetra-	5U	ug/l	
					1,2-Dichloropropane	5U	ug/l		cis-1,3-Dichloropropene	5U	ug/l	
					2-Butanone	10U	ug/l		trans-1,3-Dichloropropene	5U	ug/l	
Metals - Total Recov		Water-Total	Result	Units	1,1,2-Trichloroethane	5U	ug/l		Surrog: D4-1,2-Dichloro-	93	% Recov	
					Trichloroethene	5U	ug/l		Surrog: 1,4-Bromofluor-	102	% Recov	
					ETHANE, 1,1,2,2-TETRAC+	5U	ug/l		Surrog: D8-Toluene	102	% Recov	
					1,2,3-Trichlorobenzene	5U	ug/l					
Cadmium Tot-Rec		0.20U	ug/l		Hexachlorobutadiene	5U	ug/l					
Mercury Tot-Rec		.06U	ug/l		Naphthalene	5U	ug/l					
					Total Xylenes	5U	ug/l					
Metals - Total Recov		Water-Total	Result	Units	2-Chlorotoluene	5U	ug/l					
					1,2-Dichlorobenzene	5U	ug/l					
					1,2,4-Trimethylbenzene	5U	ug/l					
					DBCP	5U	ug/l					
Calcium Tot-Rec		34.0 *	mg/l		1,2,3-Trichloropropane	5U	ug/l					
Mgnsium Tot-Rec		7.27 *	mg/l		Tert-Butylbenzene	5U	ug/l					
Sodium Tot-Rec		5.58 *	mg/l		Isopropylbenzene (Cumene)	5U	ug/l					
Potssium Tot-Rec		2.1 *	mg/l		p-Isopropyltoluene	5U	ug/l					
Iron Tot-Rec		67.9 *	ug/l		BENZENE, ETHYL-	5U	ug/l					
Mangnese Tot-Rec		16.3 *	ug/l		BENZENE, ETHENYL-	5U	ug/l					
					BENZENE, PROPYL-	5U	ug/l					
					Butylbenzene	5U	ug/l					
					4-Chlorotoluene	5U	ug/l					
					1,4-Dichlorobenzene	5U	ug/l					
					1,2-Dibromoethane (EDB)	10U	ug/l					
					1,2-Dichloroethane	5U	ug/l					
					Vinyl Acetate	10U	ug/l					
+-----+ Ion Chromatography Water-Total Result Units +-----+ Chloride 1.94 * mg/l Sulfate Total 6.59 * mg/l												

(Sample Complete)

20-DEC-89
12:45:04

Washington State Department of Ecology
Sample/Project Analysis Results

Page 5

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES)

Officer: AFJ

Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378133

Description: CHATTARY

Source: Ambient Stream/River

Begin Date: 89/09/12 :

Gen Inorg/Phys-Speci		Water-Total	Result	Units	Metals - Total Recov		Water-Total	Result	Units	VOA - PP Scan (GCMS)		Water-Total		
					Calcium	Tot-Rec				Mgnesium	Tot-Rec			
Cond@25C	Meter	167	*	umho/cm	Sodium	Tot-Rec	26.8	*	mg/l	Potassium	Tot-Rec	5.67	*	mg/l
pH LAB	Meter	8.4	*	Std Unts	Iron	Tot-Rec	4.74	*	mg/l	Mangnese	Tot-Rec	1.7	*	mg/l
Alk-Tot	CaCO ₃	92	*	mg/l			66.4	*	ug/l			0.1	*	ug/l
Alk-HCO ₃	CaCO ₃	93	*	mg/l										
Alk-CO ₃	CaCO ₃	1U		mg/l										
Hard-Tot	CaCO ₃	97	*	mg/l										
Silica	Total	16.0	*	mg/l										
Turbidity	Meter	1.6	*	NTU										
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Solids - Specified		Water-Total	Result	Units	VOA - PP Scan (GCMS)		Water-Total	Result	Units	VOA - PP Scan (GCMS)		Water-Total		
Solids					Water-Total					*** Continued ***				
T-Suspen		1U	mg/l		Result					Result				
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Nutrients - Specific		Water-Total	Result	Units	Carbon Tetrachloride		5U	ug/l		Isopropylbenzene (Cumene)		5U	ug/l	
NO ₂ NO ₃ -N		Total	0.17	*	Acetone		10U	ug/l		p-Isopropyltoluene		5U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Metals - Total Recov		Water-Total	Result	Units	Chloroform		5U	ug/l		BENZENE, ETHYL-		5U	ug/l	
Mercury		Tot-Rec	.06U	ug/l	Benzene		5U	ug/l		BENZENE, ETHENYL-		5U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Metals - Total Recov		Water-Total	Result	Units	1,1,1-Trichloroethane		5U	ug/l		BENZENE, PROPYL-		5U	ug/l	
Matrix Spike #1					Bromomethane		10U	ug/l		Butylbenzene		5U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Mercury		Tot-Rec	108	% Recov	Chloroethane		5U	ug/l		4-Chlorotoluene		5U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Metals - Total Recov		Water-Total	Result	Units	1,4-Dichlorobenzene		5U	ug/l		1,4-Dichlorobenzene		5U	ug/l	
Matrix Spike #2					1,2-Dibromoethane (EDB)		10U	ug/l		1,2-Dichloroethane		5U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Mercury		Tot-Rec	118	% Recov	Vinyl Acetate		10U	ug/l		Vinyl Acetate		10U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Metals - Total Recov		Water-Total	Result	Units	1,3,5-Trimethylbenzene		5U	ug/l		4-Methyl-2-Pentanone		10U	ug/l	
Matrix Spike #1					Bromobenzene		5U	ug/l		1,3,5-Trimethylbenzene		5U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Mercury		Tot-Rec	108	% Recov	Toluene		5U	ug/l		Bromobenzene		5U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Metals - Total Recov		Water-Total	Result	Units	1,2,4-Trichlorobenzene		5U	ug/l		Chlorobenzene		5U	ug/l	
Matrix Spike #2					Dibromochloromethane		5U	ug/l		1,2,4-Trichlorobenzene		5U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Mercury		Tot-Rec	118	% Recov	Tetrachloroethene		5U	ug/l		Dibromochloromethane		5U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Metals - Total Recov		Water-Total	Result	Units	Sec-Butylbenzene		5U	ug/l		Tetrachloroethene		5U	ug/l	
Matrix Spike #1					1,3-Dichloropropane		5U	ug/l		Sec-Butylbenzene		5U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Mercury		Tot-Rec	108	% Recov	1,1-Dichloropropane		5U	ug/l		1,3-Dichloropropane		5U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Metals - Total Recov		Water-Total	Result	Units	1,1-Dichloroethene		5U	ug/l		Cis-1,2-Dichloroethene		5U	ug/l	
Matrix Spike #2					Trichlorofluoromethane		5U	ug/l		trans-1,2-Dichloroethene		5U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Mercury		Tot-Rec	108	% Recov	Methane, Dichlorodifluoromethane		10U	ug/l		1,3-Dichloroethene		5U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Metals - Total Recov		Water-Total	Result	Units	1,2-Dichloropropane		5U	ug/l		1,1-Dichloropropane		5U	ug/l	
Matrix Spike #1					2-Butanone		10U	ug/l		2,2-Dichloropropane		5U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Mercury		Tot-Rec	108	% Recov	1,1,2-Trichloroethane		5U	ug/l		2-Hexanone		10U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Metals - Total Recov		Water-Total	Result	Units	Trichloroethene		5U	ug/l		Ethane, 1,1,1,2-Tetrachloroethene		5U	ug/l	
Matrix Spike #2					ETHANE, 1,1,2,2-TETRAC		5U	ug/l		cis-1,3-Dichloropropene		5U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Mercury		Tot-Rec	118	% Recov	Hexachlorobutadiene		5U	ug/l		trans-1,3-Dichloropropene		5U	ug/l	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Metals - Total Recov		Water-Total	Result	Units	Naphthalene		5U	ug/l		Surrog: D4-1,2-Dichloroethene		95	t Recov	
Matrix Spike #1					Total Xylenes		5U	ug/l		Surrog: 1,4-Bromofluoromethane		98	t Recov	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Mercury		Tot-Rec	118	% Recov	2-Chlorotoluene		5U	ug/l		Surrog: D8-Toluene		103	t Recov	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Metals - Total Recov		Water-Total	Result	Units	1,2-Dichlorobenzene		5U	ug/l		Carbon Tetrachloride		95	t Recov	
Matrix Spike #2					1,2,4-Trimethylbenzene		5U	ug/l		Acetone		10U	t Recov	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Mercury		Tot-Rec	108	% Recov	DBCP		5U	ug/l		Chloroform		98	t Recov	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														
Metals - Total Recov		Water-Total	Result	Units	1,2,3-Trichloropropane		5U	ug/l		Benzene		110	t Recov	
Matrix Spike #1					Tert-Butylbenzene		5U	ug/l		1,1,1-Trichloroethane		101	t Recov	
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+														

(Continued on next page)

20-DEC-89
12:45:04

Washington State Department of Ecology
Sample/Project Analysis Results

Page 6

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES)

Officer: AFJ

Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378133

Description: CHATTARY

Source: Ambient Stream/River

Begin Date: 89/09/12 :

VOA - PP Scan (GCMS) Water-Total			VOA - PP Scan (GCMS) Water-Total			VOA - PP Scan (GCMS) Water-Total		
*** Continued ***			*** Continued ***			*** Continued ***		
Matrix Spike #1	Result	Units	Matrix Spike #1	Result	Units	Matrix Spike #2	Result	Units
Chloromethane	114	% Recov	1,2,4-Trichlorobenzene	94	% Recov	Trichloroethene	100	% Recov
Dibromomethane	102	% Recov	Dibromochloromethane	110	% Recov	ETHANE, 1,1,2,2-TETRAC+	104	% Recov
Bromoform	5U	% Recov	Tetrachloroethene	90	% Recov	1,2,3-Trichlorobenzene	97	% Recov
Bromochloromethane	113	% Recov	Sec-Butylbenzene	84	% Recov	Hexachlorobutadiene	75	% Recov
Vinyl Chloride	103	% Recov	1,3-Dichloropropane	115	% Recov	Naphthalene	106	% Recov
Methylene Chloride	99B	% Recov	Cis-1,2-Dichloroethene	100	% Recov	Total Xylenes	90	% Recov
Carbon Disulfide	5U	% Recov	trans-1,2-Dichloroethet+	94	% Recov	2-Chlorotoluene	90	% Recov
Bromodichloromethane	109	% Recov	1,3-Dichlorobenzene	99	% Recov	1,2-Dichlorobenzene	95	% Recov
1,1-Dichloroethane	127	% Recov	1,1-Dichloropropene	98	% Recov	1,2,4-Trimethylbenzene	86	% Recov
1,1-Dichloroethene	112	% Recov	2,2-Dichloropropane	80	% Recov	DBCP	117	% Recov
Trichlorofluoromethane	93	% Recov	2-Hexanone	140	% Recov	1,2,3-Trichloropropane	110	% Recov
Methane, Dichlorodiflu+	102	% Recov	Ethane, 1,1,1,2-Tetrac+	105	% Recov	Tert-Butylbenzene	86	% Recov
1,2-Dichloropropane	97	% Recov	cis-1,3-Dichloropropene	109	% Recov	Isopropylbenzenes (Cume+)	85	% Recov
2-Butanone	86	% Recov	trans-1,3-Dichloroprop+	105	% Recov	p-Isopropyltoluene	80	% Recov
1,1,2-Trichloroethane	154	% Recov	Surrog: D4-1,2-Dichlor+	102	% Recov	BENZENE, ETHYL-	90	% Recov
Trichloroethene	112	% Recov	Surrog: 1,4-Bromofluor+	99	% Recov	BENZENE, ETHENYL-	96	% Recov
ETHANE, 1,1,2,2-TETRAC+	102	% Recov	Surrog: D8-Toluene	105	% Recov	BENZENE, PROPYL-	83	% Recov
1,2,3-Trichlorobenzene	103	% Recov	+-----			Butylbenzene	82	% Recov
Hexachlorobutadiene	82	% Recov	VOA - PP Scan (GCMS) Water-Total			4-Chlorotoluene	89	% Recov
Naphthalene	110	% Recov	Matrix Spike #2			1,4-Dichlorobenzene	89	% Recov
Total Xylenes	95	% Recov	Result Units			1,2-Dibromoethane (EDB)	114	% Recov
2-Chlorotoluene	91	% Recov	Carbon Tetrachloride	93	% Recov	1,2-Dichloroethane	98	% Recov
1,2-Dichlorobenzene	99	% Recov	Acetone	10U	% Recov	Vinyl Acetate	56	% Recov
1,2,4-Trimethylbenzene	90	% Recov	Chloroform	92	% Recov	4-Methyl-2-Pentanone	130	% Recov
DBCP	115	% Recov	Benzene	104	% Recov	1,3,5-Trimethylbenzene	84	% Recov
1,2,3-Trichloropropane	115	% Recov	1,1,1-Trichloroethane	94	% Recov	Bromobenzene	101	% Recov
Tert-Butylbenzene	90	% Recov	Bromomethane	103	% Recov	Toluene	101	% Recov
Isopropylbenzenes (Cume+)	89	% Recov	Chloromethane	110	% Recov	Chlorobenzene	98	% Recov
p-Isopropyltoluene	86	% Recov	Dibromomethane	106	% Recov	1,2,4-Trichlorobenzene	92	% Recov
BENZENE, ETHYL-	95	% Recov	Bromoform	SU	% Recov	Dibromochloromethane	111	% Recov
BENZENE, ETHENYL-	98	% Recov	Chloroethane	100	% Recov	Tetrachloroethene	83	% Recov
BENZENE, PROPYL-	88	% Recov	Vinyl Chloride	97	% Recov	Sec-Butylbenzene	81	% Recov
Butylbenzene	83	% Recov	Methylene Chloride	93B	% Recov	1,3-Dichloropropene	116	% Recov
4-Chlorotoluene	95	% Recov	Carbon Disulfide	5U	% Recov	Cis-1,2-Dichloroethene	88	% Recov
1,4-Dichlorobenzene	92	% Recov	Bromoform	106	% Recov	trans-1,2-Dichloroethet+	88	% Recov
1,2-Dibromoethane (EDB)	114	% Recov	Bromodichloromethane	131	% Recov	1,3-Dichlorobenzene	94	% Recov
1,2-Dichloroethane	103	% Recov	1,1-Dichloroethane	101	% Recov	1,1-Dichloropropene	89	% Recov
Vinyl Acetate	78	% Recov	1,1-Dichloroethene	83	% Recov	2,2-Dichloropropane	72	% Recov
4-Methyl-2-Pentanone	130	% Recov	Trichlorofluoromethane	87	% Recov	2-Hexanone	140	% Recov
1,3,5-Trimethylbenzene	91	% Recov	Methane, Dichlorodiflu+	90	% Recov	Ethane, 1,1,1,2-Tetrac+	103	% Recov
Bromobenzene	104	% Recov	1,2-Dichloropropane	96	% Recov	cis-1,3-Dichloropropene	109	% Recov
Toluene	104	% Recov	2-Butanone	140	% Recov	trans-1,3-Dichloroprop+	108	% Recov
Chlorobenzene	103	% Recov	1,1,2-Trichloroethane	111	% Recov	Surrog: D4-1,2-Dichlor+	103	% Recov
						Surrog: 1,4-Bromofluor+	99B	% Recov

(Continued on next page)

20-DEC-89
12:45:04

Washington State Department of Ecology
Sample/Project Analysis Results

Page 7

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES)

Officer: AFJ

Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378133

Description: CHATTARY

Source: Ambient Stream/River

Begin Date: 89/09/12 :

VOA - PP Scan (GCMS)	Water-Total
*** Continued ***	
Matrix Spike #2	Result Units
Surrog: D8-Toluene	104 † Recov

Ion Chromatography	
Water-Total	
Chloride	1.63 * mg/l
Sulfate Total	4.76 * mg/l

(Sample Complete)

20-DEC-89
12:45:04Washington State Department of Ecology
Sample/Project Analysis Results

Page 8

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES)

Officer: AFJ

Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378134

Description: CHATTARY

Source: Ambient Stream/River

Begin Date: 89/09/13 :

Gen Inorg/Phys-Speci			Water-Total		VOA - PP Scan (GCMS)		Water-Total			VOA - PP Scan (GCMS)		Water-Total			
			Result	Units			Result	Units		Result	Units	*** Continued ***		Result	Units
Cond@25C	Meter		185	umho/cm	Carbon Tetrachloride		5U	ug/l		4-Methyl-2-Pentanone		10U	ug/l		
pH LAB	Meter		7.9	Std Unts	Acetone		10U	ug/l		1,3,5-Trimethylbenzene		5U	ug/l		
Alk-Tot	CaCO ₃		94	mg/l	Chloroform		5U	ug/l		Bromobenzene		5U	ug/l		
Alk-HCO ₃	CaCO ₃		94	mg/l	Benzene		5U	ug/l		Toluene		5U	ug/l		
Alk-CO ₃	CaCO ₃		1U	mg/l	1,1,1-Trichloroethane		5U	ug/l		Chlorobenzene		5U	ug/l		
Hard-Tot	CaCO ₃		100	mg/l	Bromomethane		10U	ug/l		1,2,4-Trichlorobenzene		5U	ug/l		
Silica	Total		16.5	mg/l	Chloromethane		10U	ug/l		Dibromochloromethane		5U	ug/l		
Turbidity	Meter		0.9	NTU	Dibromomethane		5U	ug/l		Tetrachloroethene		5U	ug/l		
					Bromoform		5U	ug/l		Sec-Butylbenzene		5U	ug/l		
					Bromodichloromethane		5U	ug/l		1,3-Dichloropropene		5U	ug/l		
					1,1-Dichloroethane		5U	ug/l		Cis-1,2-Dichloroethene		5U	ug/l		
					1,1-Dichloroethene		5U	ug/l		trans-1,2-Dichloroethene		5U	ug/l		
					Trichlorofluoromethane		5U	ug/l		1,3-Dichlorobenzene		5U	ug/l		
					Methane, Dichlorodiflu+		10U	ug/l		1,1-Dichloropropene		5U	ug/l		
					1,2-Dichloropropane		5U	ug/l		2,2-Dichloropropane		5U	ug/l		
					2-Butanone		10U	ug/l		2-Hexanone		10U	ug/l		
					1,1,2-Trichloroethane		5U	ug/l		Ethane, 1,1,1,2-Tetra-		5U	ug/l		
					Trichloroethene		5U	ug/l		cis-1,3-Dichloropropene		5U	ug/l		
					ETHANE, 1,1,2,2-TETRAC+		5U	ug/l		trans-1,3-Dichloropropene		5U	ug/l		
					1,2,3-Trichlorobenzene		5U	ug/l		Surrog: D4-1,2-Dichlor+	96	% Recov			
					Hexachlorobutadiene		5U	ug/l		Surrog: 1,4-Bromofluor+	102	% Recov			
					Naphthalene		5U	ug/l		Surrog: D8-Toluene	103	% Recov			
					Total Xylenes		5U	ug/l							
					2-Chlorotoluene		5U	ug/l							
					1,2-Dichlorobenzene		5U	ug/l							
					1,2,4-Trimethylbenzene		5U	ug/l							
					DBCP		5U	ug/l							
					1,2,3-Trichloropropane		5U	ug/l							
					Tert-Butylbenzene		5U	ug/l							
					Isopropylbenzene (Cumene)		5U	ug/l							
					p-Isopropyltoluene		5U	ug/l							
					BENZENE, ETHYL-		5U	ug/l							
					BENZENE, ETHENYL-		5U	ug/l							
					BENZENE, PROPYL-		5U	ug/l							
					Butylbenzene		5U	ug/l							
					4-Chlorotoluene		5U	ug/l							
					1,4-Dichlorobenzene		5U	ug/l							
					1,2-Dibromoethane (EDB)		10U	ug/l							
					1,2-Dichloroethane		5U	ug/l							
					Vinyl Acetate		10U	ug/l							

(Sample Complete)

20-DEC-89
12:45:04

**Washington State Department of Ecology
Sample/Project Analysis Results**

Page 9

Project: DOE-077E LITTLE SPOKANE RIVER (WASH. LAKES)

Officers: AFJ

Account: D3400

Laboratory: Ecology, Manchester

Description: CHATTARY

Source: Ambient Stream/River

Begin Date: 89/09/12

Gen Inorg/Phys-Speci			Water-Total			VOA - PP Scan (GCMS)			Water-Total			VOA - PP Scan (GCMS)			Water-Total		
			Result	Units					Result	Units				*** Continued ***		Result	Units
Cond@25C	Meter		179	*	umho/cm	Carbon Tetrachloride			5U	ug/l	4-Methyl-2-Pentanone			10U	ug/l		
pH LAB	Meter		8.3	*	Std Units	Acetone			10U	ug/l	1,3,5-Trimethylbenzene			5U	ug/l		
Alk-Tot	CaCO ₃		94	*	mg/l	Chloroform			5U	ug/l	Bromobenzene			5U	ug/l		
Alk-HCO ₃	CaCO ₃		94	*	mg/l	Benzene			5U	ug/l	Toluene			5U	ug/l		
Alk-CO ₃	CaCO ₃		1U	mg/l	1,1,1-Trichloroethane			5U	ug/l	Chlorobenzene			5U	ug/l			
Hard-Tot	CaCO ₃		98	*	mg/l	Bromomethane			10U	ug/l	1,2,4-Trichlorobenzene			5U	ug/l		
Silica	Total		16.9	*	mg/l	Chloromethane			10U	ug/l	Dibromochloromethane			5U	ug/l		
Turbidity	Meter		1.2	*	NTU	Dibromomethane			5U	ug/l	Tetrachloroethene			5U	ug/l		
Solids - Specified			Water-Total			Bromoform			5U	ug/l	Sec-Butylbenzene			5U	ug/l		
			Result	Units		Chloroethane			10U	ug/l	1,3-Dichloropropane			5U	ug/l		
Solids	T-Suspen		1	*	mg/l	Vinyl Chloride			10U	ug/l	Cis-1,2-Dichloroethene			5U	ug/l		
Nutrients - Specific			Water-Total			Methylene Chloride			5U	ug/l	trans-1,2-Dichloroethene			5U	ug/l		
			Result	Units		Carbon Disulfide			5U	ug/l	1,3-Dichlorobenzene			5U	ug/l		
NO ₂ NO ₃ -N	Total		0.18	*	mg/l	Bromodichloromethane			5U	ug/l	1,1-Dichloropropene			5U	ug/l		
Metals - Total Recov			Water-Total			1,1-Dichloroethane			5U	ug/l	2,2-Dichloropropane			5U	ug/l		
			Result	Units		1,1-Dichloroethene			5U	ug/l	2-Hexanone			10U	ug/l		
Cadmium	Tot-Rec		0.20U	ug/l		Trichlorofluoromethane			5U	ug/l	Ethane, 1,1,1,2-Tetrac+			5U	ug/l		
Mercury	Tot-Rec		.06U	ug/l		Methane, Dichlorodiflu+			10U	ug/l	cis-1,3-Dichloropropene			5U	ug/l		
Metals - Total Recov			Water-Total			1,2-Dichloropropane			5U	ug/l	trans-1,3-Dichloroprop+			5U	ug/l		
			Result	Units		2-Butanone			10U	ug/l	Surrog: D4-1,2-Dichlor+			96	t Recov		
						1,1,2-Trichloroethane			5U	ug/l	Surrog: 1,4-Bromofluor+			98	t Recov		
						Trichloroethene			5U	ug/l	Surrog: D8-Toluene			103	t Recov		
						ETHANE, 1,1,2,2-TETRAC+			5U	ug/l	Ion Chromatography			Water-Total			
						1,2,3-Trichlorobenzene			5U	ug/l				Result	Units		
						Hexachlorobutadiene			5U	ug/l							
						Naphthalene			5U	ug/l							
						Total Xylenes			5U	ug/l							
						2-Chlorotoluene			5U	ug/l	Chloride			3.21	*	mg/l	
						1,2-Dichlorobenzene			5U	ug/l	Sulfate	Total		4.88	*	mg/l	
						1,2,4-Trimethylbenzene			5U	ug/l							
						DBCP			5U	ug/l							
						1,2,3-Trichloropropane			5U	ug/l							
						Tert-Butylbenzene			5U	ug/l							
						Isopropylbenzene (Cumene)			5U	ug/l							
						p-Isopropyltoluene			5U	ug/l							
						BENZENE, ETHYL-			5U	ug/l							
						BENZENE, ETHENYL-			5U	ug/l							
						BENZENE, PROPYL-			5U	ug/l							
						Butylbenzene			5U	ug/l							
						4-Chlorotoluene			5U	ug/l							
						1,4-Dichlorobenzene			5U	ug/l							
						1,2-Dibromoethane (EDB)			10U	ug/l							
						1,2-Dichloroethane			5U	ug/l							
						Vinyl Acetate			10U	ug/l							

(Sample Complete)

20-DEC-89
12:45:04

Washington State Department of Ecology
Sample/Project Analysis Results

Page 10

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES)

Officer: AFJ

Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378136

Description: TRNSFRBK

Source: Ambient Stream/River

Begin Date: 89/09/12 :

VOA - PP Scan (GCMS)	Water-Total		VOA - PP Scan (GCMS)	Water-Total	
	Result	Units		*** Continued ***	Result
Carbon Tetrachloride	5U	ug/l	4-Methyl-2-Pentanone	10U	ug/l
Acetone	10U	ug/l	1,3,5-Trimethylbenzene	5U	ug/l
Chloroform	5U	ug/l	Bromobenzene	5U	ug/l
Benzene	5U	ug/l	Toluene	5U	ug/l
1,1,1-Trichloroethane	5U	ug/l	Chlorobenzene	5U	ug/l
Bromomethane	10U	ug/l	1,2,4-Trichlorobenzene	5U	ug/l
Chloromethane	10U	ug/l	Dibromochloromethane	5U	ug/l
Dibromomethane	5U	ug/l	Tetrachloroethene	5U	ug/l
Bromoform	5U	ug/l	Sec-Butylbenzene	5U	ug/l
Bromodichloromethane	5U	ug/l	1,3-Dichloropropene	5U	ug/l
1,1-Dichloroethane	5U	ug/l	Cis-1,2-Dichloroethene	5U	ug/l
1,1-Dichloroethene	5U	ug/l	trans-1,2-Dichloroethene	5U	ug/l
Trichlorofluoromethane	5U	ug/l	1,3-Dichlorobenzene	5U	ug/l
Methane, Dichlorodiflu+	10U	ug/l	1,1-Dichloropropene	5U	ug/l
1,2-Dichloropropene	5U	ug/l	2,2-Dichloropropane	5U	ug/l
2-Butanone	10U	ug/l	2-Hexanone	10U	ug/l
1,1,2-Trichloroethane	5U	ug/l	Ethane, 1,1,1,2-Tetra-	5U	ug/l
Trichloroethene	5U	ug/l	cis-1,3-Dichloropropene	5U	ug/l
ETHANE, 1,1,2,2-TETRAC+	5U	ug/l	trans-1,3-Dichloroprop-	5U	ug/l
1,2,3-Trichlorobenzene	5U	ug/l	Surrog: D4-1,2-Dichlor+	96	% Recov
Hexachlorobutadiene	5U	ug/l	Surrog: 1,4-Bromofluor+	98	% Recov
Naphthalene	5U	ug/l	Surrog: D8-Toluene	101	% Recov
Total Xylenes	5U	ug/l			
2-Chlorotoluene	5U	ug/l			
1,2-Dichlorobenzene	5U	ug/l			
1,2,4-Trimethylbenzene	5U	ug/l			
DBCP	5U	ug/l			
1,2,3-Trichloropropene	5U	ug/l			
Tert-Butylbenzene	5U	ug/l			
Isopropylbenzene (Cumene)	5U	ug/l			
p-Isopropyltoluene	5U	ug/l			
BENZENE, ETHYL-	5U	ug/l			
BENZENE, ETHENYL-	5U	ug/l			
BENZENE, PROPYL-	5U	ug/l			
Butylbenzene	5U	ug/l			
4-Chlorotoluene	5U	ug/l			
1,4-Dichlorobenzene	5U	ug/l			
1,2-Dibromoethane (EDB)	10U	ug/l			
1,2-Dichloroethane	5U	ug/l			
Vinyl Acetate	10U	ug/l			

(Sample Complete)

20-DEC-89
12:45:01

Washington State Department of Ecology
Sample/Project Analysis Results

Page 11

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES)

Officer: AFJ

Account: D3400

Laboratory: Ecology, Manchester

Sample No: 89 378137

Description: TRNSPTBK

Source: Ambient Stream/River

Begin Date: 89/09/12 :

Metals - Total Recov		Water-Total	Result	Units	VOA - PP Scan (GCMS)	Water-Total	Result	Units
Cadmium Tot-Rec		0.20U	ug/l		*** Continued ***			
Mercury Tot-Rec		.06U	ug/l					
Metals - Total Recov		Water-Total	Result	Units	DBCP	5U	ug/l	
					1,2,3-Trichloropropane	5U	ug/l	
					Tert-Butylbenzene	5U	ug/l	
					Isopropylbenzene (Cume+)	5U	ug/l	
					p-Isopropyltoluene	5U	ug/l	
					BENZENE, ETHYL-	5U	ug/l	
Iron Tot-Rec		5.0U	ug/l		BENZENE, ETHENYL-	5U	ug/l	
Mangnese Tot-Rec		2.0 *	ug/l		BENZENE, PROPYL-	5U	ug/l	
VOA - PP Scan (GCMS)		Water-Total	Result	Units	Butylbenzene	5U	ug/l	
					4-Chlorotoluene	5U	ug/l	
					1,4-Dichlorobenzene	5U	ug/l	
					1,2-Dibromoethane (EDB)	10U	ug/l	
					1,2-Dichloroethane	5U	ug/l	
Carbon Tetrachloride		5U	ug/l		Vinyl Acetate	10U	ug/l	
Acetone		10U	ug/l		4-Methyl-2-Pentanone	10U	ug/l	
Chloroform		5U	ug/l		1,3,5-Trimethylbenzene	5U	ug/l	
Benzene		5U	ug/l		Bromobenzene	5U	ug/l	
1,1,1-Trichloroethane		5U	ug/l		Toluene	5U	ug/l	
Bromomethane		10U	ug/l		Chlorobenzene	5U	ug/l	
Chloromethane		10U	ug/l		1,2,4-Trichlorobenzene	5U	ug/l	
Dibromomethane		5U	ug/l		Dibromochloromethane	5U	ug/l	
Bromochloromethane		5U	ug/l		Tetrachloroethene	5U	ug/l	
Chloroethane		10U	ug/l		Sec-Butylbenzene	5U	ug/l	
Vinyl Chloride		10U	ug/l		1,3-Dichloropropane	5U	ug/l	
Methylene Chloride		5U	ug/l		Cis-1,2-Dichloroethene	5U	ug/l	
Carbon Disulfide		5U	ug/l		trans-1,2-Dichloroethene	5U	ug/l	
Bromoform		5U	ug/l		1,3-Dichlorobenzene	5U	ug/l	
Bromodichloromethane		5U	ug/l		1,1-Dichloropropene	5U	ug/l	
1,1-Dichloroethane		5U	ug/l		2,2-Dichloropropene	5U	ug/l	
1,1-Dichloroethene		5U	ug/l		2-Hexanone	10U	ug/l	
Trichlorofluoromethane		5U	ug/l		Ethane, 1,1,1,2-Tetrac+	5U	ug/l	
Methane, Dichlorodiflu+		10U	ug/l		cis-1,3-Dichloropropene	5U	ug/l	
1,2-Dichloropropane		5U	ug/l		trans-1,3-Dichloroprop+	5U	ug/l	
2-Butanone		10U	ug/l		Surrog: D4-1,2-Dichlor+	97	% Recov	
1,1,2-Trichloroethane		5U	ug/l		Surrog: 1,4-Bromofluor+	100	% Recov	
Trichloroethene		5U	ug/l		Surrog: D8-Toluene	101	% Recov	
ETHANE, 1,1,2,2-TETRAC+		5U	ug/l					
1,2,3-Trichlorobenzene		5U	ug/l					
Hexachlorobutadiene		5U	ug/l					
Naphthalene		5U	ug/l					
Total Xylenes		5U	ug/l					
2-Chlorotoluene		5U	ug/l					
1,2-Dichlorobenzene		5U	ug/l					
1,2,4-Trimethylbenzene		5U	ug/l					

(Sample Complete)

20-DEC-89
12:45:04

Washington State Department of Ecology
Sample/Project Analysis Results

Page 12

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES)

Officer: AFJ

Account: D3400

Blank ID: BW9268

VOA - PP Scan (GCMS)	Water-Total	Result	Units	VOA - PP Scan (GCMS)	Water-Total	Result	Units
Blank #1				Blank #1			
Carbon Tetrachloride	5U	ug/l		4-Methyl-2-Pentanone	10U	ug/l	
Acetone	10U	ug/l		1,3,5-Trimethylbenzene	5U	ug/l	
Chloroform	5U	ug/l		Bromobenzene	5U	ug/l	
Benzene	5U	ug/l		Toluene	5U	ug/l	
1,1,1-Trichloroethane	5U	ug/l		Chlorobenzene	5U	ug/l	
Bromomethane	10U	ug/l		1,2,4-Trichlorobenzene	5U	ug/l	
Chloromethane	10U	ug/l		Dibromochloromethane	5U	ug/l	
Dibromomethane	5U	ug/l		Tetrachloroethene	5U	ug/l	
Bromoform	5U	ug/l		Sec-Butylbenzene	5U	ug/l	
Bromodichloromethane	5U	ug/l		1,3-Dichloropropane	5U	ug/l	
1,1-Dichloroethane	5U	ug/l		Cis-1,2-Dichloroethene	5U	ug/l	
1,1-Dichloroethene	5U	ug/l		trans-1,2-Dichloroethene	5U	ug/l	
Trichlorofluoromethane	5U	ug/l		1,3-Dichlorobenzene	5U	ug/l	
Methane, Dichlorodiflu+	10U	ug/l		1,1-Dichloropropene	5U	ug/l	
1,2-Dichloropropene	5U	ug/l		2,2-Dichloropropane	5U	ug/l	
2-Butanone	10U	ug/l		2-Hexanone	10U	ug/l	
1,1,2-Trichloroethane	5U	ug/l		Ethane, 1,1,1,2-Tetracl+	5U	ug/l	
Trichloroethene	5U	ug/l		cis-1,3-Dichloropropene	5U	ug/l	
ETHANE, 1,1,2,2-TETRAC+	5U	ug/l		trans-1,3-Dichloroprop+	5U	ug/l	
1,2,3-Trichlorobenzene	5U	ug/l		Surrog: D4-1,2-Dichlor+	89	% Recov	
Hexachlorobutadiene	5U	ug/l		Surrog: 1,4-Bromofluor+	98	% Recov	
Naphthalene	5U	ug/l		Surrog: D8-Toluene	104	% Recov	
Total Xylenes	5U	ug/l					
2-Chlorotoluene	5U	ug/l					
1,2-Dichlorobenzene	5U	ug/l					
1,2,4-Trimethylbenzene	5U	ug/l					
DBCP	5U	ug/l					
1,2,3-Trichloropropane	5U	ug/l					
Tert-Butylbenzene	5U	ug/l					
Isopropylbenzene (Cum+	5U	ug/l					
p-Isopropyltoluene	5U	ug/l					
BENZENE, ETHYL-	5U	ug/l					
BENZENE, ETHENYL-	5U	ug/l					
BENZENE, PROPYL-	5U	ug/l					
Butylbenzene	5U	ug/l					
4-Chlorotoluene	5U	ug/l					
1,4-Dichlorobenzene	5U	ug/l					
1,2-Dibromoethane (EDB)	10U	ug/l					
1,2-Dichloroethane	5U	ug/l					
Vinyl Acetate	10U	ug/l					

(Sample Complete)

20-DEC-89
12:45:04

Washington State Department of Ecology
Sample/Project Analysis Results

Page 13

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES)

Officer: AFJ

Account: D3400

Blank ID: PB 41.72

Metals - Total Recov		Water-Total	
		Result	Units
Blank #1			
Cadmium	Tot-Rec	0.37	* ug/l

Metals - Total Recov		Water-Total	
		Result	Units
Blank #2			
Calcium	Tot-Rec	.0010U	mg/l
Magnesium	Tot-Rec	.0010U	mg/l
Sodium	Tot-Rec	.046	* mg/l
Potassium	Tot-Rec	.50U	mg/l
Iron	Tot-Rec	5.0U	ug/l
Manganese	Tot-Rec	1.0U	ug/l

(Sample Complete)

20-DEC-89
12:45:04

Washington State Department of Ecology
Sample/Project Analysis Results

Page 14

Project: DOE-077F LITTLE SPOKANE RIVER (WASH. LAKES)

Officer: AFJ

Blank ID: PB 44.73

Account: D3400

Metals - Total Recov		Water-Total	
Blank #2		Result	Units
Cadmium	Tot-Rec	0.20U	ug/l

Metals - Total Recov		Water-Total	
Blank #1		Result	Units
Calcium	Tot-Rec	.0010U	mg/l
Mgnesium	Tot-Rec	.0010U	mg/l
Sodium	Tot-Rec	.044 *	mg/l
Potssium	Tot-Rec	.50U	mg/l
Iron	Tot-Rec	5.0U	ug/l
Mangnese	Tot-Rec	1.0U	ug/l

(Sample Complete)